

AERATION

INTRODUCTION

Aeration is one of the most important maintenance tasks carried out on turf. Aeration means to get air into something. In turf it is simply the production of holes through the turf surface into the underlying rootzone (soil) to allow gases (oxygen etc.) in and out of the soil and for water and grass roots to move down through the soil.

HOW IS IT DONE?

Traditionally, holes have been created in the turf surface originally using a fork and subsequently with a range of metal implements fitted with tines. Below are the most commonly used of these metal tines.

THE RIGHT TINE FOR THE JOB

The correct selection of aeration tine is critical if the desired results are to be obtained. Sports turf managers should ask themselves what it is they wish to achieve by way of aeration, consider the soil profile and then select the most logical choice of tine. In order to assist in such decisions the following information may be of assistance.

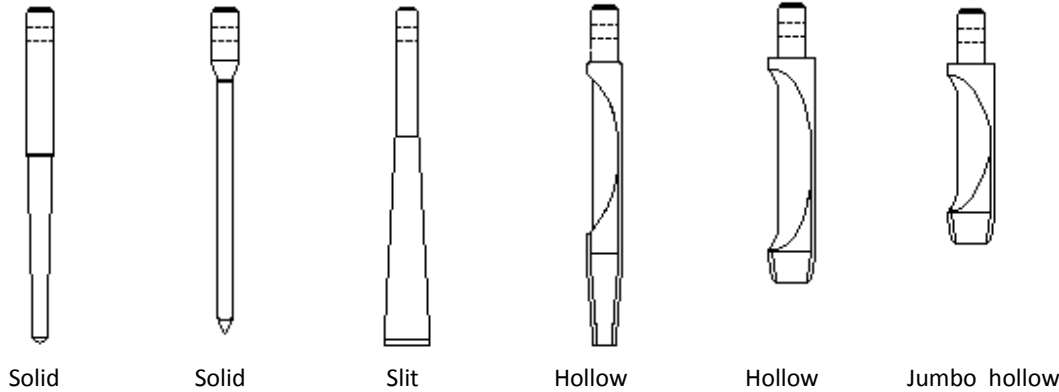


Fig.1 - Types of aeration tines

TINE TYPE - HOLLOW

These are best suited to:

- Relief of soil compaction – this is because a core is removed from the soil leaving space for plant roots to grow into.
- Soil exchanging – the cores of soil removed can be replaced with an improved top dressing such as sand or a sand and soil mix.
- Aiding thatch control – the ejected cores contain thatch, which is removed from the turf.

Note: - The effect of hollow tines on cricket squares should be considered before use.

TINE TYPE - SOLID

These are best suited to:

- Use on hard or stony ground - this is due to the tines strong construction and resulting resistance to damage and wear.
- Allowing air into the soil during general aeration (there are no cores to remove from the surface so it is quicker to use than hollow tines).
- Enhancing the flow of irrigation water into dry turf during drought conditions. Solid tines create a round hole in the turf surface that will not open up as the surface dries.

Solid tines are best avoided:

- During wet conditions on heavy soils as the pushing of the tine into the soil can smear the edges of the tine holes making drainage worse.

TINE TYPE - SLIT

These are best suited to:

- Root pruning as they slice through a large soil area (this operation is best done in spring and summer as the warming soil will stimulate the grass to produce new root growth).
- Provision of drainage . as the tine cuts through a large soil profile in the rootzone it can greatly improve drainage of the turf surface without too much interruption to play.
- General aeration . as the tine creates less surface damage it is well suited to general use to allow air into the rootzone. Also slits show the biggest soil/air interface.

Slit tines are best avoided:

- During hot and dry conditions as the slit left by the tine can open up. This is caused by the loss of water from the soil at the edge of the tine slit resulting in the soil shrinking back from the edges. This is most likely on soils with a high clay content.
- Caution should be advised against too late in the spring as slits can open up subsequently. Better to consider slitting in the autumn when soil conditions are favourable.

TINE TYPE - SPOON

These are best suited to:

- The same functions as the hollow tine, however they have the advantage of being stronger and less likely to become blocked during use. However they do leave a larger gaping hole.

TINE TYPE - CHISEL

These are best suited to:

- Hard ground conditions, due to its strong construction.
- General aeration of the soil due to the limited disruption of the playing surface.

OTHER METHODS OF AERATION

In recent years other methods of aeration have been developed and these are:

Drills

These use a power system, which turns a large number of drills mounted on a deck. The drills can penetrate deeply into extremely hard soils regardless of the moisture content or stone content.

However they are slow to use and expensive to buy. They are best suited to specialised areas and conditions.

Compressed air

This system of aeration uses a metal tine, which is most often hydraulically driven into the turf surface. Once the tine has been driven into the turf surface, compressed air, which has been stored in a tank, is released down the tine emerging at great pressure into the surrounding soil. This pressurised air raises the soil and fractures it; this leaves a huge number of fissures in the soil for movement of air and water. The drawback of this system is the slow working speed and cost of machinery. It is not suited to regular use and is most often used to deal with specific compaction problems.

Compressed water

A development of recent years no metal tine is used. Instead, a number of jets of highly compressed water are fired at the soil surface in pulses. These jets of water cut into the turf surface and underlying material. The main advantage with this system is the lack of disruption to the soil surface (indeed it is often hard to tell that aeration has taken place). However there are several draw backs to this system in that: -

- The machines are expensive to purchase.
- The speed of operation is rather slow.
- The depth of penetration is affected by hard ground conditions.

Vibrating blades

These machines use sharp blades that vibrate as they cut through the soil. This has an effect that is similar to a Verti-Drain (i.e. the soil is physically heaved creating fissures for root growth and drainage etc.).

The Verti-Drain

This machine has taken the concept of using metal tines for aeration to its fullest extent. Although it uses conventional tines It differs from normal aerators in that when the tines are pushed into the soil they can be rocked to pre-set amount. This heaves the soil and fractures it leaving large numbers of fissures in the soil (see fig 1) for development of roots and improved water and air movement. In its action it is not unlike the old groundsman who aerated his turf using a hand fork which he pushed into the soil and then rocked backwards to lift the turf.

If you would like details on any of our short courses please contact the address below.

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